REMARKS

Claims 1 and 3-12 are pending in this application. Claims 3-12 are withdrawn from further consideration.

The Office Action rejects claim 1 under 35 U.S.C. §103(a) over U.S. Patent No. 5,834,140 to Wolski et al. ("Wolski"). Applicants respectfully traverse the rejection.

Claim 1 recites, "An electrodeposited copper foil with low roughness surface, wherein surface roughness (Rz) is 2.0 μm or less, surface uniformity is provided with degree of mirror gloss of the roughness surface, measured by Gs (85°) in accordance with JIS (Japanese Industrial Standard) Z 8741 is 100 or more and low roughness without uneven surge, and a percent elongation is 10.0% or higher at 180°C." Wolski at least fails to teach or suggest an electrodeposited copper foil having the mirror gloss as recited in claim 1.

The Office Action, on page 3, asserts that Wolski discloses a copper foil with a matte side that has a surface roughness (Rz) of from 0.5 to 2.1 μm and an elongation of 18.6 to 19.5 % at 180°C. However, the Office Action, on page 4, acknowledges that Wolski does not disclose that the foil has "surface uniformity is provided with degree of mirror gloss of the roughness surface, measured by Gs (85°) in accordance with JIS (Japanese Industrial Standard) Z 8741 is 100 or more" as recited in claim 1. Instead, the Office Action asserts that because the copper foil disclosed by Wolski has the claimed Rz value and the claimed percent elongation, the copper foil disclosed by Wolski *inherently* possesses the claimed mirror gloss (Gs is 100 or more). Applicants respectfully disagree.

As is well settled:

> To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'

In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). In other words, it must be clear to one of ordinary skill in the art that the product discussed in Wolski necessarily possesses all of the properties and characteristics of the copper foil recited in claim 1 in order to support an inherency rejection. As will be discussed below, evidence found, e.g., in the instant specification precludes such a determination.

Wolski discloses that glue is added into the electrolyte solutions. See Wolski, Abstract. It is well known that such a process results in a rough and uneven surface that consists of uneven surface undulations. Wolski discloses that utilizing the electrolyte composition disclosed in Wolski with other organic compounds results in fine copper particles and a plating surface in which "less unevenness can be obtained." Wolski, col. 5, lines 7-17. However, this "less unevenness" is a comparative phrase used to compare the disclosed plating surface with one that is normally obtained and is known to be uneven. Put differently, this disclosure of Wolski does not provide a measurable indicia for the disclosed "unevenness" or surface uniformity.

Further, the Office Action asserts that because Wolski discloses a copper foil with Rz values within the range as presently claimed, it would be inherent that the copper foil would have the claimed surface gloss. However, this assertion is unfounded. There is not necessarily a correlation between surface roughness (Rz) and surface uniformity (Gs). The surface uniformity measurement conducted by the Applicants (Gs) measures concave and convex portions of the foil over a very small interval of 10 to 100 μm, while the surface roughness measurement (Rz) measures the average undulation over a 4 mm interval. Therefore, if over a 4 mm interval, a foil has 10 concave and convex undulations of 2.0 μm each, the average undulation over the 4 mm interval may be the same as a foil that has only one convex undulation over the same 4 mm interval. However, the difference in the number

undulations can be detected over a 10 or 100 μm interval and, thus, would be reflected in the Gs measurement but not in a Rz measurement.

The above argument will be further elaborated with reference to the attached figure. Example 1 in the attached figure corresponds to a foil with a Gs value above 100, because it has few undulations, which correlates into a higher Gs value, and Example 2 corresponds to a foil with a Gs value below 100, because it has many undulations, which correlates to a lower Gs value. As can be seen in the attached figure, over a 4 mm interval, both Example 1 and Example 2 begin at x and end at x-1, have a maximum convex portion at x+1, and a minimum concave portion at x-1, and thus the average undulation over this 4 mm interval would be the same for both Example 1 and Example 2, resulting in a similar Rz value. However, over a smaller interval, such as 10 or 100 μm, Example 1 has a maximum convex portion somewhere between x and x+1 and no concave portion, while Example 2 still have convex and concave portions at x+1 and x-1. Thus, the Gs value for Example 1 and Example 2 is much different.

The elements of claim 1 that are not disclosed in Wolski, as discussed above, are not chemical properties but are physical or structural elements, such as imparted to the copper foil by how the copper foil is produced or manufactured. The missing descriptive elements of Wolski cannot be inherent because the processes Wolski uses to make its foil is clearly different from the novel process disclosed in the present application at least because Wolski uses a glue in the electrolyte composition that is known to cause unevenness. The claimed copper foil made by the claimed method has very gradual steps between the concave and convex portions, and thus has a high Gs value, which is not necessarily correlated to a Rz value, and is not necessarily present in the foil disclosed by Wolski.

Further, the Office Action states that Table 2 in the present specification supports the Office Action's assertion that the foil disclosed by Wolski would inherently possess the

claimed Gs value because all the examples in this table "which has both side roughness Rz less than 2.2 and percent elongation 10.0 % or higher at 180°C, have the claimed property: surface uniformity of the foil with degree of mirror gloss of the roughness surface, measured by Gs (85°) in accordance with JIS (Japanese Industrial Standard) Z8741 is 100 or more." While the Office Action's statement is technically correct, its assertion that this is evidence that the foil disclosed in Wolski would inherently possess the claimed Gs value is flawed. The Office Action's assertion is flawed at least because the only examples in Table 2 that have an Rz value less than 2.2 and elongation of 10.0% or higher at 180°C are the examples prepared by the claimed method as exemplary copper foils that necessarily would possess the claimed Gs value as well as the other claimed features. Therefore, by this statement, the Office Action is merely asserting that the foils prepared according the claimed method possess the claimed physical properties (Rz, Gs, and percent elongation), not that all foils with the claimed percent elongation and Rz values, prepared by any other method, such as by the method of Wolski, necessarily have the claimed Gs value.

For at least the reasons stated above, the Office Action has not met its burden of showing that the foil disclosed by Wolski teaches or suggests, explicitly or inherently, each and every feature of claim 1. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

Ronald R. Snider
Registration No. 24,962

Nicolas A. Brentlinger
Registration No. 62,211

RRS:NAB/kjl

Attachment:
Figure 1
Petition for Extension of Time

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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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